Listing of Claims

1. (currently amended) An apparatus to reduce particle contamination to a semiconductor device vacuum process chamber interior by thermal cycling of fasteners comprising:

a vacuum process chamber ~~adapted to operate under vacuum, said process chamber~~ having a substantially vertical chamber wall defining a chamber interior, said process chamber selected from the group consisting of a vapor deposition chamber, an ashing chamber and an etching chamber;

a showerhead provided in said process chamber and having a lateral surface engaging said chamber wall; and

a plurality of exterior fasteners extending from an exterior of said process chamber completely through ~~and penetrating~~ said chamber wall ~~into said chamber interior and~~ into said showerhead with an exterior portion of said plurality of exterior fasteners physically separated from said chamber interior to prevent said particle contamination from said fasteners to said chamber interior;

wherein said showerhead comprises a plurality of fastener

openings in said lateral surface of said showerhead each one of said fastener openings arranged to receive one of a corresponding one of said plurality of exterior fasteners, each of said openings substantially sealed off from the chamber interior by abutment of the showerhead against the chamber wall.

2. (original) The apparatus of claim 1 wherein each of said plurality of exterior fasteners comprises a fastener head and a threaded shank extending from said fastener head, and wherein said fastener head engages an exterior surface of said chamber wall.

3. (original) The apparatus of claim 1 further comprising a gas mix plate carried by said chamber wall above said showerhead.

4. (canceled)

5. (previously presented) The apparatus of claim 1 further comprising a confinement ring provided in said process chamber beneath said showerhead.

Claims 6-21 (canceled)

22. (currently amended) The apparatus of claim [[2]]1, wherein said plurality of fasteners and fastener openings are threaded.

23. (previously presented) The apparatus of claim 1, where said plurality of exterior fasteners are arranged equally spaced from each other along a circumference of said chamber wall.

24. (currently amended) An apparatus to reduce particle contamination to a semiconductor device vacuum process chamber interior by thermal cycling of fasteners comprising:

a vacuum process chamber ~~adapted to operate under vacuum, said process chamber~~ having a substantially vertical chamber wall defining a chamber interior, said process chamber selected from the group consisting of a vapor deposition chamber, an ashing chamber and an etching chamber;

a showerhead provided in said process chamber and having a lateral surface engaging said chamber wall; and

a plurality of exterior fasteners extending from an exterior of said process chamber completely through ~~and penetrating~~ said chamber wall ~~into said chamber interior and~~ into said showerhead,

an exterior of said plurality of exterior fasteners physically separated from said chamber interior by abutment of said showerhead against said chamber wall to prevent said particle contamination from said fasteners to said chamber interior;

wherein said showerhead comprises a plurality of fastener openings in said lateral surface of said showerhead each one of said fastener openings arranged to receive one of a corresponding one of said plurality of exterior fasteners, each of said openings substantially sealed off from the chamber interior by abutment of the showerhead against the chamber wall.

25. (previously presented) The apparatus of claim 24 wherein each of said plurality of exterior fasteners comprises a fastener head and a threaded shank extending from said fastener head, and wherein said fastener head engages an exterior surface of said chamber wall.

26. (canceled)

27. (currently amended) The apparatus of claim 24 [[26]], wherein said plurality of fasteners and fastener openings are threaded.

28. (previously presented) The apparatus of claim 24, where said

plurality of exterior fasteners are arranged equally spaced from each other along a circumference of said chamber wall.

29. (previously presented) The apparatus of claim 24 further comprising a gas mix plate carried by said chamber wall above said showerhead.

30. (previously presented) The apparatus of claim 24 further comprising a confinement ring provided in said process chamber beneath said showerhead.

31. (currently amended) An apparatus to reduce particle contamination to a semiconductor device vacuum process chamber interior by thermal cycling of fasteners comprising:

a vacuum process chamber ~~adapted to operate under vacuum, said process chamber~~ having a substantially vertical chamber wall defining a chamber interior, said process chamber selected from the group consisting of a vapor deposition chamber, an ashing chamber and an etching chamber;

a showerhead provided in said process chamber and having a lateral surface engaging said chamber wall; and

a plurality of exterior fasteners, each exterior fastener extending from an exterior of said process chamber completely through a respective first opening in said chamber wall to penetrate said chamber wall ~~into said chamber interior and~~ into a corresponding second opening in said lateral surface such that an exterior surface of said plurality of exterior fasteners are physically separated from said chamber interior by abutment of said showerhead against said chamber wall to prevent said particle contamination from said fasteners to said chamber interior, wherein each of said second openings is substantially sealed off from the chamber interior by abutment of the showerhead against the chamber wall.

32. (previously presented) The apparatus of claim 31 wherein each of said plurality of exterior fasteners comprises a fastener head and a threaded shank extending from said fastener head, and wherein said fastener head engages an exterior surface of said chamber wall.

33. (previously presented) The apparatus of claim 32, wherein said plurality of fasteners and fastener openings are threaded.

34. (previously presented) The apparatus of claim 31, where said plurality of exterior fasteners are arranged equally spaced from

each other along a circumference of said chamber wall.

35. (previously presented) The apparatus of claim 31 further comprising a gas mix plate carried by said chamber wall above said showerhead.

36. (previously presented) The apparatus of claim 31 further comprising a confinement ring provided in said process chamber beneath said showerhead.